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Mr. Benjamin Rice, Project Manager
Geotechnical Branch
Division of Waste Management
Office of Nuclear Material Safety & Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: BWIP Site, Hanford, Washington DEA Review Comments

Dear Mr. Rice:

The enclosed comments are the result of Weston Geophysical's review of the above referenced DEA. Our comments are presented in the format described in "Standard Review Plan for Draft Environmental Assessments", dated December 12, 1984.

As directed by you and your fellow staff members, we have concentrated our comments on significant aspects of the DEA documents which impact guideline criteria.

Should you have any questions or require clarification regarding this submittal, please contact us.

Very truly yours,

WESTON GEOPHYSICAL CORPORATION

Edward N. Levine

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DEA

BWIP SITE, HANFORD, WASHINGTON

REVIEW COMMENTS
PREPARED BY
WESTON GEOPHYSICAL CORPORATION

FOR
THE UNITED STATES NUCLEAR REGULATORY COMMISSION

MAJOR COMMENT #1 DEA: BWIP

Subject: Structure and Tectonics

Comment: Section 4.1 Site Characterization Activities, page 4-2 and 4-3, begins with the Waste Policy Act definition of site characterization. The last part of Item B, states those items to be included in site characterization but excludes "preliminary borings and geophysical testing needed to assess whether site characterization should be undertaken". It would appear that the geophysical testing recently conducted and currently in progress by Rockwell is pre-site characterization and therefore being conducted in order to make the assessment whether site characterization should in fact be undertaken. The determination to proceed with site characterization is based on the information presented in the environmental assessment. It would thus appear that the reviewers of the DEA would need the results of the preliminary geophysical testing in order to assess whether site characterization should be undertaken. Since there is not one piece of geophysical information included in this DEA, it is recommended that the results and interpretations of the geophysical surveys as presented in other Rockwell publications [see Comment #3-4] be appropriately included in Sections 3.2.3, 6.3.1.7 and 6.3.3.4 of the DEA in order to allow the decision makers to deal with "a full deck" in their decision making process.

DETAILED COMMENT #2-1 DEA: BWIP

Section: 2.1.1.3 Seismicity, p. 2-15, para. 2

Comment: The statement that "deep seismicity generally takes place in a seemingly random pattern, associated neither with known geologic structure or areas of shallow seismicity" is a premature conclusion. Seismic refraction studies and other geologic information indicate a thickness of approximately 4 to 5 kilometers of basalt underlain by sedimentary material to a depth of approximately 8 to 10 kilometers where a higher velocity upper crustal layer has been detected. The spatial and temporal distributions of earthquakes are critical to the determination of the tectonic model of the Pasco Basin area, that is whether the structures are rooted or whether a decollement surface is present at some depth, perhaps even as shallow as the repository location. Deeper structures which have yet to be determined by surface geophysical methods, in part due to the complexities of the near-surface 4 to 5 kilometer thickness of basalt, may be revealed by some earthquake alignment. It is suggested that a better representation of the regional seismic activity in the Pasco Basin area would be to plot all instrumental earthquakes greater than 8 or 10 kilometers in depth as done by Caggiano, 1983, ST-19, Figure 2-9 rather than plot only the earthquakes greater than magntiude 3 for such a short time period of 14 to 15 years. A better statement would be that the association of seismicity with geologic structures is an ongoing study.

DETAILED COMMENT #2-2 DEA: BWIP

Section: 2.1.1.2 Tectonics, p. 2-15, 2-16

Comment: Low average rates of deformation based on calculations and limited observations, may prove to be sufficient for long term tectonic modeling. However, an average rate implies that there are periods of low deformation and periods where there are high rates of deformation such as an episodic faulting. This section should be revised to show consideration of localized peaks in the deformation rates and the amount of movement to be anticipated along existing faults during periods of accelerated deformation.

DETAILED COMMENT #3-1 DEA: BWIP

Section: 3.2.2 Stratigraphy, p. 3-10 [highlighted items]

Comment: The geophysical data base used for developing "stratigraphy" is listed as highlighted items. There is no presentation anywhere in the DEA, even in summary form, of the results of the geophysical surveys and how they are input to stratigraphy. Geophysics is commonly used to distinguish structure or the continuity of stratigraphy rather than stratigraphy in the classic sense as described in Section 3.2.2. The DEA should be modified, most appropriately in the section on Cold Creek Syncline structure, to describe, even in summary form, the results of the geophysical surveys and how they were input into selection of the reference repository location.

DETAILED COMMENT #3-2 DEA: BWIP

Section: 3.2.2.1.3, Cohasset Flow, p. 3-24, para. 2

Comment: If "the colonnade-entablature tiers are not readily correlated from borehole to borehole in the reference repository location", then the flow may have more heterogeneities than are indicated in this section. The consistency in position of the intermediate vesicular zone in terms of elevation is more of assumption since it is based on only a few boreholes. It is possible that other vesicular zones may be present at other elevations within the Cohasset flow in the area of the RRL. The geophysical logs of 5 boreholes as reported in SD-BWI-DP-035, revision B-0, September 7, 1983, show changes in characteristics from logs for RRL-6 and RRL-14 which are very similar, to the log for borehole DC-4. Changes in geophysical log characteristics are indicative of lateral changes within the basalt flows. This paragraph should be modified to more appropriately address the uncertainties of the internal stratigraphy within the Cohasset flow.

DETAILED COMMENT #3-3 DEA: BWIP

Section: 3.2.3 Structure and Tectonics, p. 3-45 through 3-53

Comment: It is recommended that a more detailed map of the structural geologic features of the Pasco Basin be included in the EA. Many locations and geologic features including the width of RAW are referenced in this section, however, the locations are not shown on any figure.

DETAILED COMMENT #3-4 DEA: BWIP

Section 3.2.3.3 Cold Creek Syncline p. 3-49 - 3-50

Comment: The statement that "the central and eastern portions of the Cold Creek Syncline which included the reference repository location appears to be free of potentially adverse structures" is misleading and ignores the implications of the geophysical data presented in ST-14, ST-19 and SD-BWI-TI-177 among other publications. Numerous geophysical anomalies, some with possible fault interpretations, have been identified in these documents. In fact Figure 8-8 of ST-14 divides the RRL area into five section of "large intact volumes of bedrock" and then further divides the RRL itself based on known and inferred structures. Many of the individual MT, magnetic or seismic reflection anomalies coincide with each other. In fact, MT anomaly 9A [ST-19, Figure 4-9] coincides with multiple Wenner deconvolution solutions [Figures B-11 and B-12 of Appendix B to ST-14] with a series of low magnitude, 1971 earthquakes with focal depths in the range of 6.5 to 7.9 kilometers. In view of the concern for repository integrity as well as for solution to the tectonic model question of thin skinned versus rooted structures, it is imperative that this section be modified. At minimum, a summary of the geophysical data should be present so that the reader of the DEA will get a proper perspective of the complexity of the tectonic assessment necessary in the site characterization phase.

DETAILED COMMENT #3-4 Continued DEA: BWIP

Section 3.3.2.1.3, Bedrock Structures, p. 3-89 last paragraph contains more qualified statements concerning the structure of the Cold Creek Syncline than are presented in this section [3.2.3.1.3]. Statements in 3.3.2.1.3 such as "because the trough at the Cold Creek syncline is a broad open structure, it is interpreted to contain fewer bedrock structures relative to anticlinal areas" and "inferred or known bedrock structures in the Cold Creek Syncline have been reported [Myers, 1981] and are under investigation" are clearer representations of the actual level of knowledge than the statement in the first paragraph of page 3-50 that "the central and eastern portions of the Cold Creek Syncline, which includes the RRL, appear to be free of potentially adverse structures".

DETAILED COMMENT #3-5 DEA: BWIP

Section: 3.2.3 Structure and Tectonics, p. 3-53

Comment: Section 3.2.3 of the DEA should be modified to include a summary of RRL tectonic and geologic characterization activities currently in progress. This summary should be modeled after and even be more detailed than the summary of geohydrologic characterization activities currently underway presented in Section 3.3.2.2, Alternative Ground-water Flow Concepts, p. 3-93, last paragraph.

DETAILED COMMENT #3-6 DEA: BWIP

Section: 3.2.4 Seismicity of the RRL, p. 3-54, para. 2 sentence 1,

Comment: This statement applies only to the shallow focus [less than 4 kilometer focal depth] earthquakes. Figure 3.3-25 and other figures by Caggiano clearly show that the deeper seismic activity [greater than a depth of 8 or 10 kilometers] is similar within and outside the RRL.

DETAILED COMMENT 3-7 DEA: BWIP

Section: 3.2.4 Seismicity of the RRL, p. 3-54, para. 3

Comment: The tectonic implication of a series of earthquakes extending between a 3 kilometer focal depth within the basalt sequence to a 10 kilometer focal depth at the top of the upper crustal layer should be addressed within this DEA.

DETAILED COMMENT #3-8 DEA: BWIP

Section: 3.2.4 Seismicity of the RRL, p. 3-54, para. 4

Comment: A definitive trend of earthquake epicenters such as the northeast to southwest trend of activity 10 to 15 kilometers north of the RRL should be correlated with other geophysical trends and assessed within this DEA.

DETAILED COMMENT #3-9 DEA: BWIP

Section: 3.2.4 Seismicity of the RRL, p. 3-54, para. 6

Comment: The significance of earthquakes occurring near the base or beneath the Columbia River basalt should be assessed in the Structural Analysis Section [Section 3.2.3.8] in terms of tectonic model and correlation with other geophysical anomalies.

DETAILED COMMENT #6-1 DEA: BWIP

Section: 6.3.1.7 Tectonics, p. 6-127 second billet above 6.3.1.7.3

Comment: This item states that "interpretation of geophysical anomalies in the area of the reference repository location are ongoing". The DEA should be ammended to state what anomalies are being investigated, where are they located, what might they be, and what is their potential significance to the RRL. Until these interpretations are complete, the statement at the bottom of page 6-129 [Section 6-3-1.7.4 ] that "no faults have been identified in the reference repository location" is unsubstantiated and needs to be withdrawn or modified in the proper context of the geophysical data.

The first sentence, first full paragraph, page 6-127, states that "the interpretations of the tectonic stability within the geologic setting of the reference repository location are preliminary...." and that "interpretation of geophysical anomalies in and near the area of the reference repository location are ongoing". If so then the statement at the bottom of page 6-129 is invalid and needs to be modified, perhaps to the form that appears in the first paragraph on page 6-210 "that tectonically active faults do not appear to be present in the reference repository location based on existing data and interpretations". This statement is also inconsistent with statements in Section 6.3.3.4 Tectonics, subsection 6.3.3.4.2, Evaluation Process, page 6.209, last paragraph.

DETAILED COMMENT #6-2 DEA: BWIP

Section: 6.3.1.7.3 Favorable Conditions, p. 6-128, para. 1

Comment: See Comment #2-2 relative to rates of deformation. Since this is a post closure condition, the possibility of fault movement within the RRL must be addressed, particularly in view of the possibility of increased groundwater flow along faults and through fault breccias.

DETAILED COMMENT #6-3 DEA: BWIP

Section: 6.3.1.7.4 Potentially Adverse Condition, p. 6-129 last line

Comment: As noted above and in earlier comments, the statement that "no faults have been identified in the reference repository location" is misleading and not a fair summary of all available geologic and geophysical information. This statement needs considerable qualification.

DETAILED COMMENT #6-4 DEA: BWIP

Section: 6.3.1.7.9 Potentially Adverse Condition, p. 6-135, para. 2

Comment: The requirement calls for an evaluation of the "potential for tectonic deformation--such as uplift, subsidance, folding, or faulting". The response addresses only the low rate of deformation. If the deformation is episodic and fault movement could occur during one of the episodes of relatively high deformation, then it is possible that increased groundwater flow could occur in zones of tectonic breccia. It is likely that future deformations will occur along existing faults. Therefore, the location of these faults or structures needs to be considered i.e. the locations and interpretations of geophysical anomalies. This section needs to be revised in view of some of the possible scenarios, although the end result that the available evidence does not support a finding that this potentially adverse condition is present may not change.

EDITORIAL COMMENTS:

Section: 2.1.1, p. 2.1, para. 2

The reference for Mitchell and Bergstrom 1983 is not included in the reference list.

Section: 3.2.2.5, p. 3-43 para. 2 line 3

Figure 3-19 is incorrect, it is undoubtedly Figure 3-21.